

### **REMARKS**

This response is intended as a complete response to the Final Office Action dated November 1, 2006. In view of the following discussion, the Applicants believe that all claims are in allowable form.

The Applicants thank Examiners Arancibia and Hassanzadeh for their time and comments during the conference with Steven Shannon and Alan Taboada on February 6, 2007. The Applicants have nothing further to add to the comments provided by the Examiner in the Interview Summary given to the Applicants at the conclusion of the meeting.

### **CLAIM REJECTIONS**

#### **A. 35 USC §103 Claims 1, 3-4, 6-10, and 12-20**

Claims 1, 3-4, 6-10, and 12-20 stand rejected under 35 USC. §103(a) as being unpatentable over US Patent No. 6,642,149, issued November 4, 2003 to *Suemasa, et al.* (hereinafter *Suemasa*) Japanese Patent Application Publication No 06-243992, published September 2, 1994 to *Deguchi, et al.* (hereinafter *Deguchi*). In response, the Applicants have amended independent claims 1, 9, 10, and 19 to more clearly recite aspects of the invention. The Applicants have further amended dependent claim 20 to more clearly recite aspects of the invention.

Independent claims 1, 9, 10, and 19 each recite limitations not taught or suggested by any permissible combination of *Suemasa* and *Deguchi*. *Suemasa* teaches a plasma processing method including a process chamber having two RF power sources 122, 128, coupled through two matching devices 120, 126, to a lower electrode 106. (*Suemasa* Fig. 1 and accompanying text.)

With respect to claims 1, 9, and 10, *Suemasa* fails to teach or suggest a first sub-circuit for matching the impedance of a first variable frequency RF signal generated by a first RF source to the impedance of the plasma and a second sub-circuit for matching the impedance of a second variable frequency RF signal generated by a second RF source to the impedance of the plasma... wherein the first and second sub-circuits each further comprise at least one fixed set of series

components and at least one variable shunt component connected to ground, and wherein a first match tune space defined by the first sub-circuit can be varied without affecting a second match tune space defined by the second sub-circuit, as recited in independent claims 1, 9, and 10.

*Deguchi* teaches a plasma processing device having a matching part 14 and an RF electric power supply part 12 in which the impedance is matched by changing an oscillation frequency of output electric power on the side of the RF electric power supply part 12. *Deguchi* further is only concerned with coupling a single RF signal to an electrode. Thus, *Deguchi* fails to provide any teaching or suggestion with respect to coupling multiple frequencies to a single electrode. Moreover, *Deguchi* is thus silent with respect to any problems that may arise from configuring a match circuit to couple multiple frequencies to a single electrode. Accordingly, *Deguchi* fails to teach or suggest a modification to the apparatus of *Suemasa* that would result in a first sub-circuit for matching the impedance of a first variable frequency RF signal generated by a first RF source to the impedance of the plasma and a second sub-circuit for matching the impedance of a second variable frequency RF signal generated by a second RF source to the impedance of the plasma... wherein the first and second sub-circuits each further comprise at least one fixed set of series components and at least one variable shunt component connected to ground, and wherein a first match tune space defined by the first sub-circuit can be varied without affecting a second match tune space defined by the second sub-circuit, as recited in independent claims 1, 9, and 10. Therefore, a *prima facie* case of obviousness has not been established because the combination of *Suemasa* and *Deguchi* fails to teach or suggest the limitations recited in claims 1, 9, and 10.

Thus, claims 1, 9, and 10, and all claims depending therefrom, are patentable over *Suemasa* in view of *Deguchi*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

With respect to independent claim 19 (and claims 17 and 18, which recite similar limitations) the Examiner asserts that since portions of the ranges taught

by *Suemasa* overlap with portions of the ranges recited in the claims, that the claims are anticipated. The Applicants disagree.

The *MPEP* states that “[w]hen the prior art discloses a range which touches, overlaps or is within the claimed range, but no specific examples falling within the claimed range are disclosed, a case by case determination must be made as to anticipation. In order to anticipate the claims, the claimed subject matter must be disclosed in the reference with sufficient specificity to constitute an anticipation under the statute.” (*MPEP* §2131.03 II)(citations omitted).

In the present case, *Suemasa* teaches that a first fixed frequency may be greater than 10 MHz, is at most 200 MHz, and is preferably no greater than 100 MHz. (*Suemasa*, col. 2, ll. 49-56.) *Suemasa* further teaches that a second fixed frequency, that must be lower than the first, is preferably at least 2 MHz and at most 10 MHz, is more preferably at least 3 MHz and at most 10 MHz. (*Id.*, col. 2, ll. 34-39.) However, *Suemasa* gives no specific examples of an apparatus configured to receive both frequencies as recited in the claims. In fact, wherein the present claims recite a variable frequency range of between about 50 KHz and about 14.2 MHz for both frequencies, *Suemasa* provides only examples where the first frequency is 27 MHz or greater. (*Id.*, col. 6, l. 7 - col. 7, l. 22.)

Moreover, *Suemasa* teaches to keep a large range between the lower and higher frequency. Specifically, *Suemasa* teaches that it is desirable to keep the difference between the frequency of the high frequency power component and the frequency of the side band of the high frequency power component relatively large in order to prevent the first high frequency power component from entering into the second high frequency power supply mechanism 116 side, or the second high frequency power component from entering into the first high frequency power supply mechanism 114 side. (*Id.*, col. 7, ll. 8-20.) Therefore, *Suemasa* fails to provide any teaching with any specificity of an apparatus configured to match more closely spaced frequencies, as recited in the rejected claims.

As discussed above, *Deguchi* only discusses single power supplies and is not concerned with the interaction of multiple frequencies applied to a single electrode. Thus, *Deguchi* fails to teach or suggest a modification of the

teachings of *Suemasa* that would yield a first sub-circuit for matching the impedance of a first RF signal having a variable frequency of between about 50 KHz and about 14.2 MHz generated by a first RF source to the impedance of the plasma and a second sub-circuit for matching the impedance of a second RF signal having a variable frequency of between about 50 KHz and about 14.2 MHz generated by a second RF source to the impedance of the plasma, as recited in claim 19.

Accordingly, any combination of *Suemasa* and *Deguchi* fails to teach or suggest an apparatus wherein the first sub-circuit and the second sub-circuit are both configured to match the impedance of an RF signal having a frequency of between about 50 KHz and about 14.2 MHz, as recited in claims 17-19. Therefore, a *prima facie* case of obviousness has not been established because the combination of *Suemasa* and *Deguchi* fails to teach or suggest the limitations recited in claim 19 (and claims 17-18).

Thus, claims 17-19, and any claims depending therefrom, are patentable over *Suemasa* in view of *Deguchi*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

Moreover, *Suemasa* and *Deguchi* are each assigned to Tokyo Electron Limited. The Applicants know of no other apparatus, patents, applications, or publications by anyone else in the industry describing an apparatus as presently claimed, including any by Tokyo Electron Ltd. The Applicants submit that, although not dispositive, the lack of combination of *Suemasa* and *Deguchi* wherein each are assigned to the same owner is at least further evidence of the non-obviousness of the present claims.

Thus, claims 1, 3-4, 6-10, and 12-20 are patentable over *Suemasa* in view of *Deguchi*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

B. 35 USC §103 Claim 5

Claim 5 stands rejected under 35 USC §103 as being unpatentable over *Suemasa* in view of US Patent No. 6,887,339, issued May 3, 2005, to *Goodman*,

*et al.* (hereinafter *Goodman*). In view of the amendment to claim 1, the Applicants respectfully disagree.

Independent claim 1, from which the above rejected claim depends, recites limitations not taught or suggested by any combination of the cited references. The patentability of claim 1 over *Suemasa* and *Deguchi* has been discussed above.

The Examiner cites *Goodman* to show that RF sources conventionally have a 50 Ohm output impedance. However, *Goodman* fails to teach or suggest a first sub-circuit for matching the impedance of a first variable frequency RF signal generated by a first RF source to the impedance of the plasma and a second sub-circuit for matching the impedance of a second variable frequency RF signal generated by a second RF source to the impedance of the plasma... wherein the first and second sub-circuits each further comprise at least one fixed set of series components and at least one variable shunt component connected to ground, and wherein a first match tune space defined by the first sub-circuit can be varied without affecting a second match tune space defined by the second sub-circuit, as recited in independent claim 1. Accordingly, the teachings of *Goodman* can not be used to modify the teachings of *Suemasa* and *Deguchi* in a manner that yields the limitations recited in claim 1. Therefore, a *prima facie* case of obviousness has not been established because the combination of *Suemasa*, *Deguchi*, and *Goodman* fails to teach or suggest the limitations recited in claim 1.

Thus, claim 5 is patentable over *Suemasa* in view of *Deguchi*, and further in view of *Goodman*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claim allowed.

### **CONCLUSION**

Thus, the Applicants submit that all claims now pending are in condition for allowance. Accordingly, both further consideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that any unresolved issues still exist, it is requested that the Examiner telephone Alan Taboada at (732) 935-7100 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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